This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (Currently Amended) A method of detecting and locating noise sources each emitting a respective signal S_j with j = 1 to M, detection being provided by means of acoustic wave or vibration sensors each delivering a respective time-varying electrical signal s_i with i lying in the range 1 to N, the method ~~consisting~~ comprising:

- ~~in~~ taking the time-varying electrical signals delivered by the sensors, each signal $s_i(t)$ delivered by a sensor being the sum of the signals S_j emitted by the noise sources;
- ~~in~~ amplifying and filtering the time-varying electrical signals as taken;
- ~~in~~ digitizing the electrical signals;
- ~~in~~ calculating the functional f, such that:

$$f(n_1, \ldots, n_j, \ldots, n_M) = \frac{\det(<T_k(\omega), T_l^*(\omega)> \quad k, l = 0 \text{ to } M)}{\det(<T_k(\omega), T_l^*(\omega)> \quad k, l = 1 \text{ to } M)}$$

with

$$(T_k(\omega))_i = e^{J\omega\frac{<n_k, c_i>}{c}}$$

<.,.> being the scalar product;

.. c_i being the vector constructed between the center of gravity of the sensors and the position of sensor i;

.. n_j being the unit vector in the direction defined by the center of gravity of the senors and source j;

.. with $T_0 = s$; and

.. with c = the speed of sound; and

- in minimizing the functional f relative to the vectors $\mathbf{n}_j$ for j = 1 to M in such a manner as to determine the directions $\mathbf{n}_j$ of the noise sources, wherein ω is angular frequency,

  <u>$<T_k(\omega), T_l^*(\omega)>$ is the scalar product between $T_k(\omega)$, and $T_l^*(\omega)$,</u>

  <u>J corresponds to the imaginary number in mathematics</u>.

Claim 2 (Currently Amended) A method according to claim 1, wherein, in order to minimize the functional f when the noise sources are narrow band sources, the method ~~consists~~ <u>comprises</u>:

- ~~in~~ calculating the Fourier transforms of the signals $s_i(t)$ delivered by the sensors;
- ~~in~~ using the expressions for the determinants of the matrices of general term:

$$< T_k(\omega), T_l^*(\omega) >$$

to calculate the functional:

$$f_1 = \sum_k \|B(\omega)_k\|^2$$

- and after selecting a determined number of noise sources, ~~in~~ minimizing the functional f_1 to determine the directions $\boldsymbol{n}_j$ of the selected noise sources, <u>wherein B is the noise vector which depends on ω</u>.

Claim 3 (Currently Amended) A detection method according to claim 1, wherein, in order to minimize the functional f when the noise sources are broad band, the method ~~consists~~ <u>comprises</u>:

- ~~in~~ calculating the Fourier transforms of the signals $s_i(t)$ delivered by the sensors;
- ~~in~~ using the expressions of the determinants of the matrices of general term:

$$< T_k(\omega), T_l^*(\omega) >$$

to calculate the functional:

$$f_2 = \int \|B(\omega)\|^2 d\omega$$

- and after selecting a determined number of noise sources, ~~in~~ minimizing the functional f_2 to determine the directions $\mathbf{n}_j$ of the selected noise sources, <u>wherein dω is the derived term in the integral mathematics formulation</u>.

Claim 4 (Currently Amended) A detection method according to claim 1, wherein, in order to minimize the functional f, the method ~~consists~~ comprises:

- ~~in simplify~~ simplifying the expression for the functional f to minimize the following functional f_3:

$$f_3 = \int \det(< T_k, T_l^* > \quad k,\ l = 0 \text{ to } M)\, d\omega$$

- ~~in~~ calculating ~~the~~ cross-correlation functions γ_{ij} of the signals s_i and s_j; and
- after selecting a determined number of noise sources, ~~in~~ minimizing the functional f_3, wherein

$<T_k, T_l^*>$ is the scalar product between T_k and T_l^*.

Claim 5 (Currently Amended) A detection method according to claim 1, wherein, after the minimization operation, the method ~~consists in~~ comprises calculating the source vector:

$$S(\omega) = ({}^tT^*.T)^{-1}.{}^tT^*.s(\omega)$$

in order to discover the characteristics of the noise sources, wherein

${}^tT^*$ is the conjugate transposed matrix of T and T is a matrix,

S (ω) is the vector of S which depends on ω.